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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/601,136	06/20/2003	Makoto Kudo	81751.0062	5957

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EXAMINER

LAI, VINCENT

ART UNIT	PAPER NUMBER
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2181

DATE MAILED: 12/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/601,136	Applicant(s) KUDO, MAKOTO	
	Examiner Vincent Lai	Art Unit 2181	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>10/12/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-19 have been examined.
2. Receipt is acknowledged of all arguments and amendments submitted, where the papers have been placed of record in file.

Priority

3. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy of the priority documents have been received.

Information Disclosure Statement

4. The information disclosure statement (IDS) submitted on October 12, 2004 was considered by the examiner.

Specification

5. The abstract of the disclosure is objected to because of undue length. The abstract contains in excess of 150 words. Correction is required. See MPEP § 608.01(b).
6. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Data Processing Device and Electronic Equipment Utilizing Prefix Instructions and a Plurality of Decoders."

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-2, 5-8, 11-14, and 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Narayan et al (U.S. Patent # 5,822,559).

As per claim 1, Narayan et al discloses a data processing device which performs pipeline control, the data processing device comprising:

a fetch circuit (Figure element 202, and column 5, lines 38-40) which fetches instruction codes of a plurality of instructions in instruction queues (Column 5, lines 26-28: Queues can be used as a form of a cache), the instructions including a given target instruction (Column 5, lines 63-64: The x86 instructions are the target instructions) and a prefix instruction (Column 16, lines 9-11) which precedes the target instruction and modifies a function of the target instruction (Column 1, line 65- column 2, line 1);
a prefix instruction decoder circuit which performs decode processing only on a

prefix instruction (Figure element 207, and column 6, lines 47-49), the prefix instruction decoder circuit receiving the instruction codes of the instructions before decoding that are fetched in the instruction queues (Column 23, lines 6-9: Circuit is pipelined and cannot skip stages), judging whether or not each of the instruction codes is a given prefix instruction (Column 6, lines 59-61: This happens with a Double Dispatch Instruction), and causing a target instruction modifying information register to store information necessary for decoding the target instruction modified by the prefix instruction when the judged instruction code is the given prefix instruction (Column 6, line 61- column 7, line 2); and

a general-purpose decoder circuit which receives each of the instruction codes of the instructions fetched in the instruction queues other than the prefix instruction as a decode instruction, and decodes the decode instruction (Figure element 208, column 6, lines 19-22),

wherein, when the decode instruction is the target instruction, the decoder circuit decodes the target instruction modified by the prefix instruction based on target instruction modifying information stored in the target instruction modifying information register (Column 6, lines 59-61).

As per claim 2, Narayan et al discloses wherein the given prefix instruction includes an immediate-data expansion prefix

instruction for expanding immediate data necessary for execution of the target instruction, function of which is expanded by the prefix instruction (Column 16, lines 30-32),

wherein the prefix instruction decoder circuit causes the target instruction modifying information register to store immediate-data expansion information necessary for expanding the immediate data during execution of the target instruction modified by the immediate-data expansion prefix instruction when the input instruction code is the immediate-data expansion prefix instruction (Column 20, lines 61-65: Information is stored in latches), and

wherein the decoder circuit decodes the decode instruction so that the immediate data is expanded at the time of execution of the target instruction that has been modified by the immediate-data expansion prefix instruction based on the immediate-data expansion information stored in the target instruction modifying information register when the decode instruction is the target instruction of the immediate-data expansion prefix instruction (Column 20, lines 53-55).

As per claim 5, Narayan et al wherein the given prefix instruction includes an execution control prefix instruction for controlling whether or not to execute the target instruction, function of which is expanded by the prefix

instruction (Column 18, lines 48-62: This is done with jumps and branches),

wherein the prefix instruction decoder circuit causes the target instruction modifying information register to store execution control information necessary for controlling whether or not to execute the target instruction modified by the execution control prefix instruction when the input instruction code is the execution control prefix instruction (Column 18, lines 48-62), and

wherein the decoder circuit decodes the decode instruction so that the target instruction modified by the execution control prefix instruction is executed by judging whether or not to execute the target instruction based on the execution control information stored in the target instruction modifying information register when the decode instruction is the target instruction of the execution control prefix instruction (Column 18, lines 48-62).

As per claim 6, Narayan et al discloses wherein the fetch circuit is connected with a bus having a width at least twice the width of the instruction code, and fetches the instructions in the instruction queues through the bus in one clock cycle (Column 5, lines 40-42: Instructions are normally 32-bits and the bus is 64-bits).

As per claim 7, Narayan et al discloses wherein the target instruction is located

subsequent to the prefix instruction which modifies the target instruction
(Column 6, lines 6-9), and
wherein the prefix instruction decoder circuit performs decode processing only on
the prefix instruction for a second instruction subsequent to a first
instruction during a period in which the decoder circuit decodes the first
instruction (Figure 2, and column 23, lines 6-9: The device is pipelined).

As per claim 8, Narayan et al discloses wherein the target instruction is located
subsequent to the prefix instruction which modifies the target instruction
(Column 6, lines 6-9), and
wherein the prefix instruction decoder circuit performs decode processing only on
the prefix instruction for a second instruction subsequent to a first
instruction during a period in which the decoder circuit decodes the first
instruction (Figure 2, and column 23, lines 6-9).

As per claim 11, Narayan et al discloses wherein the target instruction is located
subsequent to the prefix instruction which modifies the target instruction
(Column 6, lines 6-9), and
wherein the prefix instruction decoder circuit performs decode processing only on
the prefix instruction for a second instruction subsequent to a first
instruction during a period in which the decoder circuit decodes the first
instruction (Figure 2, and column 23, lines 6-9).

As per claim 12, Narayan et al discloses wherein the target instruction is located subsequent to the prefix instruction which modifies the target instruction (Column 6, lines 6-9), and wherein the prefix instruction decoder circuit performs decode processing only on the prefix instruction for a second instruction subsequent to a first instruction during a period in which the decoder circuit decodes the first instruction (Figure 2, and column 23, lines 6-9).

As per claim 13, Narayan et al discloses electronic equipment comprising: the data processing device as defined in claim 1 (Column 209, lines 1-3: The computer system); means which receives input information (Column 209, lines 1-3: The input from the I/O bus and devices); and means which outputs a result processed by the data processing device based on the input information (Column 209, lines 1-3: The output from the I/O bus and devices).

As per claim 14, Narayan et al discloses electronic equipment comprising: the data processing device as defined in claim 2 (Column 209, lines 1-3); means which receives input information (Column 209, lines 1-3); and means which outputs a result processed by the data processing device based on

the input information (Column 209, lines 1-3).

As per claim 17, Narayan et al discloses electronic equipment comprising:
the data processing device as defined in claim 5 (Column 209, lines 1-3);
means which receives input information (Column 209, lines 1-3); and
means which outputs a result processed by the data processing device based on
the input information (Column 209, lines 1-3).

As per claim 18, Narayan et al discloses electronic equipment comprising:
the data processing device as defined in claim 6 (Column 209, lines 1-3);
means which receives input information (Column 209, lines 1-3); and
means which outputs a result processed by the data processing device based on
the input information (Column 209, lines 1-3).

As per claim 19, Narayan et al discloses electronic equipment comprising:
the data processing device as defined in claim 7 (Column 209, lines 1-3);
means which receives input information (Column 209, lines 1-3); and
means which outputs a result processed by the data processing device based on
the input information (Column 209, lines 1-3).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 3, 9, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Narayan et al (U.S. Patent # 5,822,559) in view of Zuraski, Jr. et al (U.S. Patent # 6,260,134 B1).

As per claim 3, Narayan et al teaches the use of prefix instructions (Column 16, lines 9-12) wherein the prefix instruction decoder circuit causes the target instruction modifying information register to store information necessary for the target instruction modified by the execution control prefix instruction (Column 18, lines 48-62), and wherein the decoder circuit decodes the decode instruction based on the information stored in the target instruction modifying information register (Column 18, lines 48-62).

Narayan et al does not teach wherein the given prefix instruction includes a shift prefix instruction for shifting an execution result of the target instruction, function of which is expanded by the prefix instruction.

Zuraski, Jr. et al teaches the use of a shift prefix instruction that is predecoded (or decoded before the main decoder) in order to simplify circuitry (Column 13, line 65-column 14, line 1).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified Narayan et al to include a shift prefix instruction to the set of existing prefix instructions.

It would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified Narayan et al by the teaching of Zuraski, Jr. because including a shift prefix instruction to the set of existing prefix instructions would simplify the circuitry, thus allowing more space for other units on the device or cutting down on places for errors to occur.

As per claim 9 and in light of above rejection of claim 3, it is rejected based upon similar reasoning as the rejections of claims 7, 8, 11, and 12.

As per claim 15 and in light of the above rejection of claim 3, it is rejected based upon similar reasoning as the rejections of claims 13, 14, 17, 18, and 19.

Therefore Narayan et al are entitled to the benefit of protection to obtain the invention as specified in claim 3, 9, and 15.

9. Claims 4, 10, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Narayan et al (U.S. Patent # 5,822,559) in view of Rozenshein et al (U.S. Patent Application Publication # US 2002/0056035 A1).

As per claim 4, Narayan et al teaches the use of prefix instructions (Column 16, lines 9-12) wherein the prefix instruction decoder circuit causes the target instruction modifying information register to store information necessary for the target instruction modified by the execution control prefix instruction (Column 18, lines 48-62), and

wherein the decoder circuit decodes the decode instruction based on the information stored in the target instruction modifying information register (Column 18, lines 48-62).

Narayan et al does not teach wherein the given prefix instruction includes a register expansion prefix instruction for expanding a register necessary for execution of the target instruction, function of which is expanded by the prefix instruction.

Rozenstein et al teaches by the use of a register expansion prefix instruction (Column 5, sections [0070] and [0082]) in order to modify the target instruction if necessary (Abstract).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified Narayan et al to include register expansions to set of existing prefix instructions.

It would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified Narayan et al by the teaching of Rozenstein et al to include register expansions to set of existing prefix instructions as to further expand upon the goal as stated by Narayan with the use of the prefix instructions.

As per claim 10 and in light of above rejection of claim 4, it is rejected based upon similar reasoning as the rejections of claims 7, 8, 11, and 12.

As per claim 16 and in light of the above rejection of claim 4, it is rejected based upon similar reasoning as the rejections of claims 13, 14, 17, 18, and 19.

Therefore Narayan et al are entitled to the benefit of protection to obtain the invention as specified in claim 4, 10, and 16.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following patents are cited to further show the art with respect to the data processing device and electronic equipment utilizing prefix instructions and a plurality of decoders:

U.S. Patent # 5,630,083 to Carbine et al shows the use of multiple decoders in a computer pipeline.

U.S. Patent # 5,809,273 to Favor et al shows the use of predecoders in a computer pipeline.

U.S. Patent # 5,875,315 to Narayan shows the use of a parallel and scalable instruction scanning unit that utilizes a predecoder.

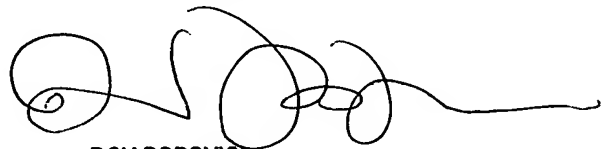
11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vincent Lai whose telephone number is (571) 272-6749. The examiner can normally be reached on M-F 8:00-5:30 (First BiWeek Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dov Popovici can be reached on (571) 272-4083. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Vincent Lai
Examiner
Art Unit 2181

vi
November 30, 2005

A handwritten signature in black ink, consisting of several loops and a long horizontal stroke at the end.

DOV POPOVICI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100